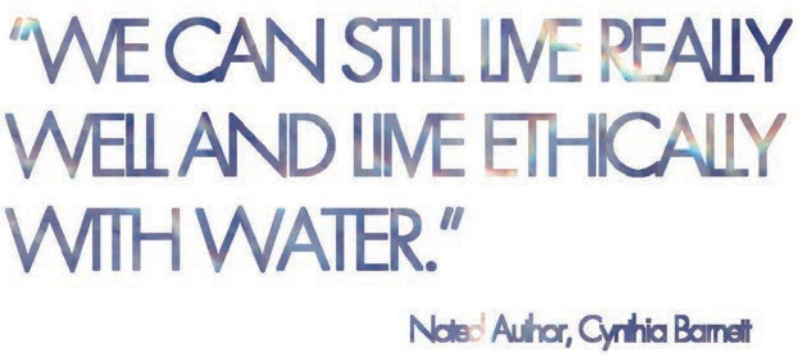
EPA CAMPUS

RAINWORKS

CHALLENGE

our water's journey from source to sink



Project Registration Number: M53
Project Location: University of Florida
Gainesville Florida

Project Abstract

A site plan was identified for a master plan of stormwater interventions on our University campus. The plan was produced for a portion of campus which could potentially treat the majority of stormwater runoff from a 67.6 acre watershed, in the event of a 100-year storm event. Water is intercepted and daylighted from existing underground pipe infrastructure into an artful treatment matrix which utilizes different methods of green infrastructure. A chain of bio-swales are linked to a bio-detention facility, working in unison to treat stormwater runoff before it is released to its natural watershed. The artful design will attract attention to the water feature and improve the aesthetic and function of campus.

Mission Statement

Our team's chosen mission is to expose water issues on campus by tracing the journey of water from a specified source to sink. By revealing the journey of stormwater across a significant portion of campus, we hope to increase public awareness of how human development impacts watersheds, and draw attention to the infrastructure used to convey and treat runoff. To this end, we wanted to enlist some of the most inspiring and informed water professionals available to aid us in our project. Throughout this process the underlying goal remains to foster and develop a societal water ethic, not simply through discourse, but an interactive, sensory experience.

Developing a Water Ethic

Early on in the exploratory process, the realization was made that the cultural perception of freshwater in America was detrimental for both the natural environment and the future of human societal health. Within the text Blue Revolution, an environmental justice piece by the author Cynthia Barnett, it was posited that Americans needed to develop a new water ethic, a better way of thinking and living with our most important, and limited, natural resource. Even with freshwater resources becoming scarce and more contested, demand in our nation has increased due to burgeoning populations and changing climates. Barnett stresses that if we do not change the ways we use our potable water, as well as how we handle our waste water, we will be faced with some very hard realizations as our water supplies continue to be depleted. While we all need to put our use of potable water in check, it is important to also modify how we deal with the black and gray water we discard in vast abundance. The state in which we return water to its natural systems is often catastrophic to the biomes it contacts. This notion resonated strongly with our design team, as stormwater in Florida is often transported right to wetlands and aquatic systems with minimal treatment, directly impacting the aquifer which we rely upon for all freshwater. As part of a land grant university, our design team felt that the campus grounds presented the ideal platform and laboratory for disseminating knowledge of a water ethic, and thus chose to present this ethic as a foundation for our design investigation.

"The Watershed of Poetic Utility"

Buster Simpson, nationally recognized artist and water activist, has been displaying functional, thought-provoking art to the world for over thirty years, and his influence helped support the foundation of a water ethic well before it was defined so clearly and eloquently by Cynthia Barnett. Simpson visited our design team while in the early stages of design development to provide guidance and insight, where he particularly stressed the importance of helping people develop a relationship to their environment through art. Simpson showed examples of how to incorporate art into design so that it is a functional component of the system that encourages people to consider what they are seeing. Instead of using blatant signage and sculpture, Simpson weaves art into silt fence, handrail, sidewalk, and cistern. He shared with us his elegant, subtle, and sometimes not-so-subtle methods for grabbing the viewer. Buster Simpson was able to view our collaboration early in the design phase, and he helped our team consider ways of treating stormwater while also creating a provocative space that engages those who pass by it.

Project Impetus

Introduction to Cynthia Barnett's philosophy for a new water ethic, as well as to different forms of green infrastructure, provided the foundation for addressing stormwater issues on our University campus. Implementing better practices of treatment for stormwater runoff is an important aspect of a blue revolution, and our team began to analyze campus for suitable areas of opportunity and intervention. With understanding of water's cyclical progression in our environment, it's journey from rainfall to the aquifer and to the springs with their gushing upwellings, it became imperative to our team that we treat water so that it returned to its natural system in as good a condition as before it encountered human development. Upon analysis of our campus and the Campus Master Plan 2005-2015, the team identified that current methods of stormwater management were undesirable and that they needed to be changed for both the sake of the natural systems as well as human perception.

Currently, stormwater is treated in a traditional matter of being piped away from developed areas as quickly as possible, towards Lake Alice, the official stormwater basin and iconic landmark of campus. These subterranean vessels spread across campus like a web, grabbing up the polluted runoff from buildings, hardscapes, and landscapes alike. The strands transport runoff directly to Lake Alice as quickly as possible. These stormwater inputs arrive in the Lake Alice Conservation Area carrying huge loads of fertilizers, suspended solids, and debris and spew into the lake. All the while no one realizes what is passing beneath their feet. For this reason, we believe that daylighting this stormwater infrastructure will provide an opportunity to perform preemptive treatment before runoff is released into the conservation area, in addition to making the public more aware of their relationship to water.

Project introduction during design charette with Buster Simpson

Buster Simpson offers design input during design charette

Cynthia Barnett delivering her lecture at the UF Gator's Read Program

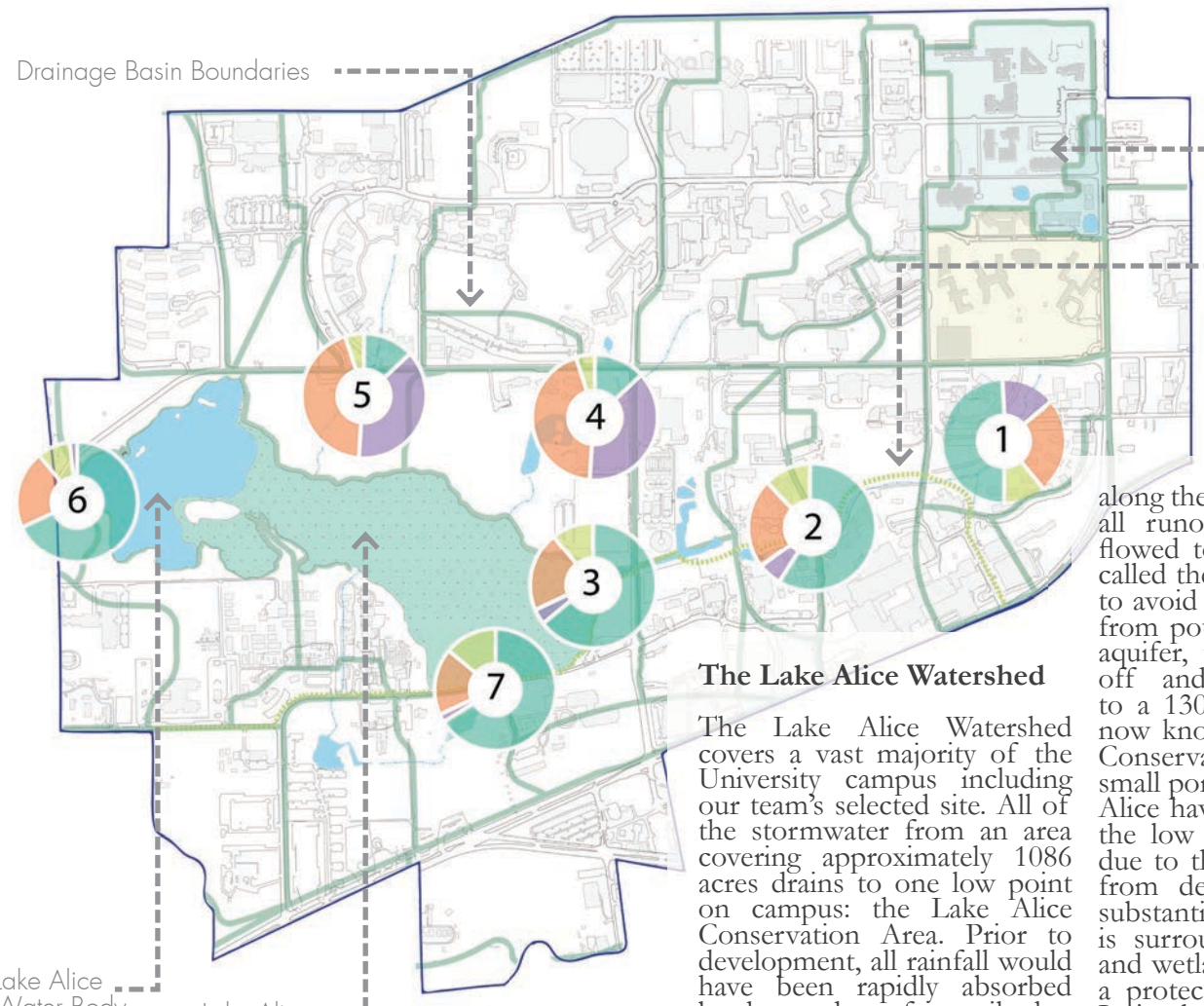
Proposal

Our team's proposal to the EPA and our University entails a system that would divert runoff, which is currently piped several feet below the ground, into visual conveyance systems which will not only transport the stormwater, but treat it and attract attention through its provocative forms. We have selected a relative source and sink which will be employed to trace stormwater across a prominent portion of the University campus. Stormwater, which is currently piped in huge volumes towards a natural creek, will be intercepted by bioswales and a tiered treatment pond which will help remove pollutants from the water and regulate its currently unimpeded flow. That stormwater which presently stampedes and scours the natural creek will now flow through a matrix of bio-conveyance and bio-detention which will slow water down to allow the drop out of sediment, promote infiltration, and regulate the flows of water during storm events. These interventions will be sited in high profile areas where people will encounter it in their day to day activities. Furthermore, the system will be designed to stand out in the landscape, to draw attention to the processes in which treating runoff and stormwater may be made beautiful, beneficial, and interesting.

Team & Advisors

Our design team is a multi-disciplinary unit comprised of people from several colleges and departments on campus: Agricultural and Biological Engineering, Environmental Engineering, Fine Arts, and Landscape Architecture. All participants contributed skills from their varying fields of study in order to craft a more well-rounded approach to the management and aesthetic visioning of stormwater remediation. Landscape Architecture participants undertook the tasks of site identification, program development, design ideation, and project synthesis. Fine Arts participation involved the exploration of incorporating art to provoke interest and introspection through design development. Engineering participants performed hydrological modeling and metric calculations to determine stormwater treatment capacity, treatment potential, and performance feasibility.

The design team was advised by members of the University faculty, employees of the University Facilities Planning and Construction Division, and additional noted professionals in our pursuit of the development of a water ethic on site. Senior Lecturer, Glenn Acomb, and Associate Professor of Wetland Ecology, Mark W. Clark, provided the initial catalyst and inputs to organize efforts on determining a site for intervention on campus. Assistant Director of Facilities Planning, Bahar Armaghani, reviewed the first phase of the project and gave input on design considerations for the area. Local author Cynthia Barnett offered the design team insight on the crafting of a water ethic. Environmental artist Buster Simpson provided design critique and guidance at the early conceptual stages of the design process.



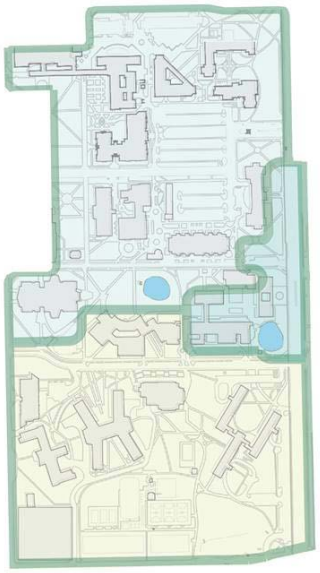
The Lake Alice Watershed

The Lake Alice Watershed covers a vast majority of the University campus including our team's selected site. All of the stormwater from an area covering approximately 1086 acres drains to one low point on campus: the Lake Alice Conservation Area. Prior to development, all rainfall would have been rapidly absorbed by the sandy surface soils that cover the upper elevations of the campus. Water which percolated through the ground would strike the Hawthorn Group, a thick layer of clay which underlies a huge portion of our state. The Hawthorn Group acts as an impervious membrane and provides subterranean sheetflow to the low points and creeks beds along the watershed. Originally, all runoff in the watershed flowed towards a natural sink called the Sweet Sink. In 1947, to avoid effluent and pollution from pouring directly into the aquifer, the sink was blocked off and flow was directed to a 130 acre lowland that is now known as the Lake Alice Conservation Area. Originally a small pond, the shores of Lake Alice have risen and spread to the low lying areas around it due to the increase of runoff from development. Now of substantial size, Lake Alice is surrounded by marshlands and wetland habitat, but is not a protected state water body. It is the original stormwater pond for the campus and still acts as one today, but no water treatment is required by law for the inputs into the Lake Alice Conservation Area. Despite its crude nature, the water body remains a naturalistic campus icon for many students, faculty, and alumni, a picturesque water feature in the heart of campus.

CONTEXT
SURROUNDING CONDITIONS

Site Sub-Watershed

The sub-watershed which encompasses our selected site drains the stormwater from approximately 67.6 acres of the campus into the Lake Alice Conservation Area, with little intervention along its journey to treat degraded water quality. Currently, the majority of stormwater is piped from the site several feet below the ground surface. Runoff from impervious surface is collected as quickly as possible and rapidly transported to Jenning's Creek which then transports it to Lake Alice. This rapid collection of runoff into pipes has led to minimal groundwater recharge, unsuitably low stream levels between storm events, and highly destructive volumes and velocities of runoff during storm events. The existing methods for campus stormwater management result in heavy nutrient loading, irregularly fluctuating water levels, and dangerously powerful flows of runoff which can be damaging to both the man-made storm utilities and the natural creeks and ponds that make up the biological portions of our campus stormwater system.



SETTING
FOR INTERVENTION

Gator Pond – A stormwater detention facility located in the northernmost portion of the site. The view of the pond is obscured by unkempt foliage and remains unknown to the hundreds of pedestrians who pass by each day.

Curb Cut/Drop Inlets – Typical rainwater runoff collection devices for the campus. Drop inlets and curb cuts collect runoff and convey grey water towards the nearest detention facility.

Inner Road – The main east-west corridor for vehicular and pedestrian traffic. Conditions are cramped, and hazardous encounters between users are regular.

Jennings Creek- Stormwater is piped from Yulee Pit into this creek corridor. Erosion from storm surge has degraded the creek banks and pipe infrastructure, creating an unwelcome environment. Signs of danger warn people away from this potential for opportune experiences.

Yulee Pit – The culmination point of all stormwater out-puts for the sub-watershed. Water enters the site through underground infrastructure systems, and is immediately dispersed into Jennings Creek.

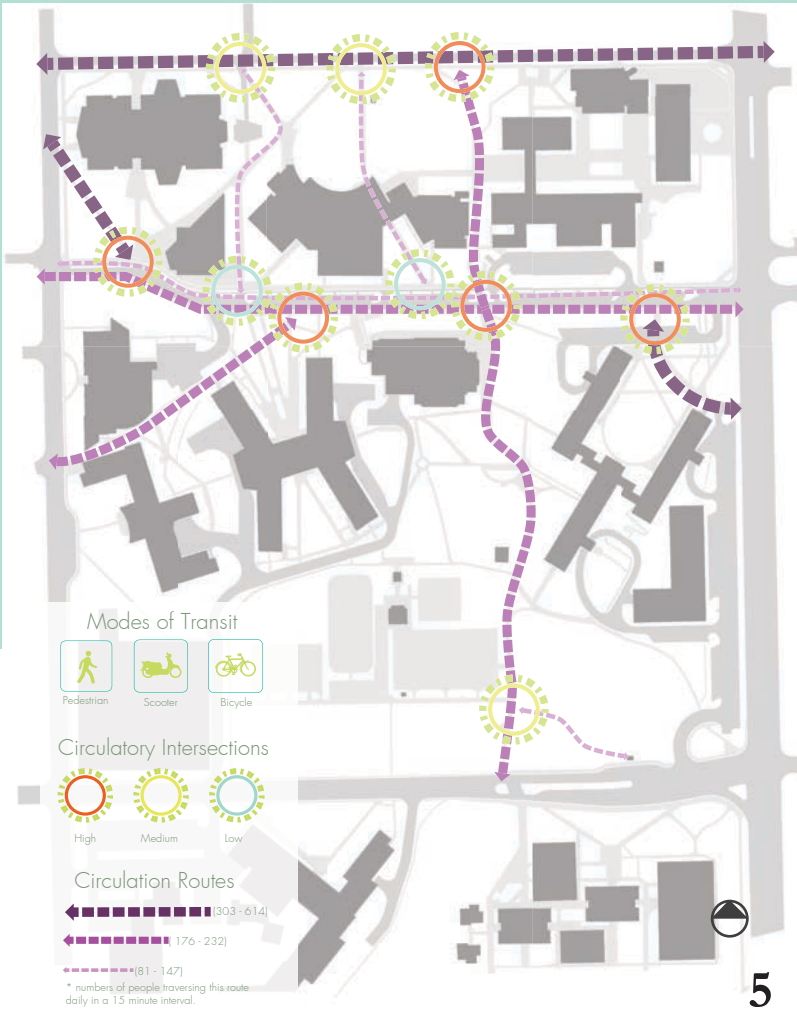
Stormwater Infrastructure

After review of our analysis, we confirmed the majority of our site collects runoff through an expansive underground piping network. Infrastructure, expanding throughout, collects surface water through catch basins and curb inlets and transports water underground to nearby detention facilities. From our evaluation it becomes evident that the majority of stormwater flows downhill across campus. Runoff flows north to south, and the majority of the watershed drains into Yulee Pit.

ANALYSIS

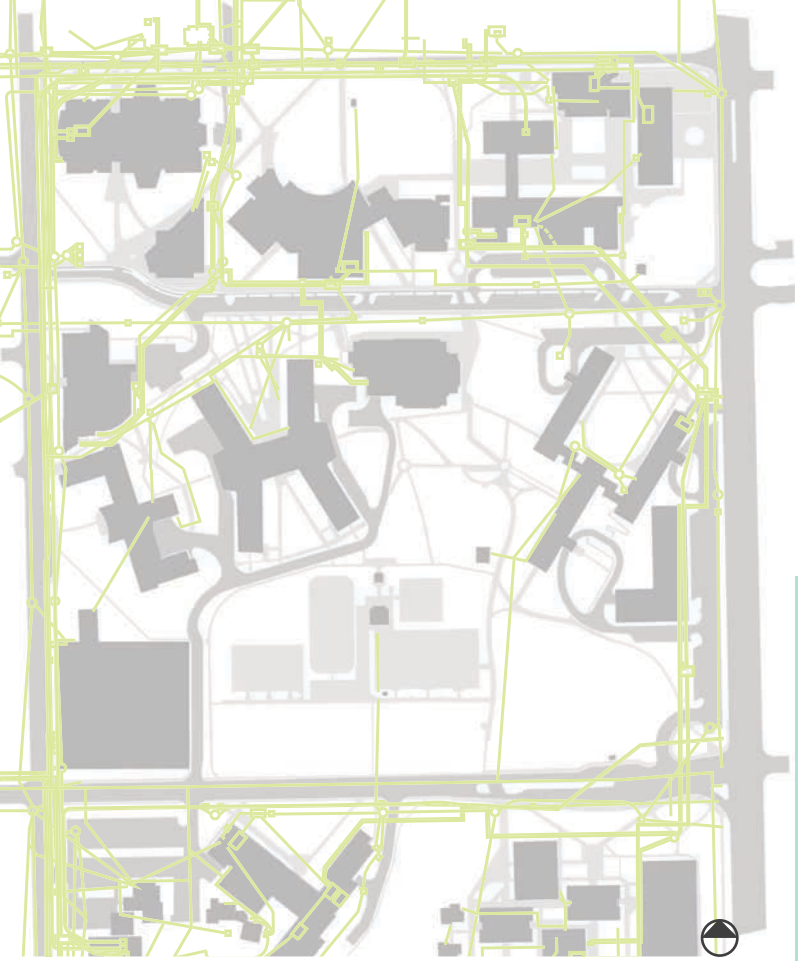
OF EXISTING CONDITIONS

After selecting our area for intervention, we conducted a site analysis to further identify specific areas of intervention. For our analysis, we surveyed four aspects of site conditions: circulation, underground utilities, surface hydrology, and stormwater infrastructure. After identifying these existing site conditions, we overlaid the various layers to identify key areas for intervention. Site characteristics of optimal opportunity meet the following criteria: areas of high circulation volume, areas lacking underground utility, areas taking advantage of existing stormwater infrastructure, and areas aiding the natural flow of surface hydrology.



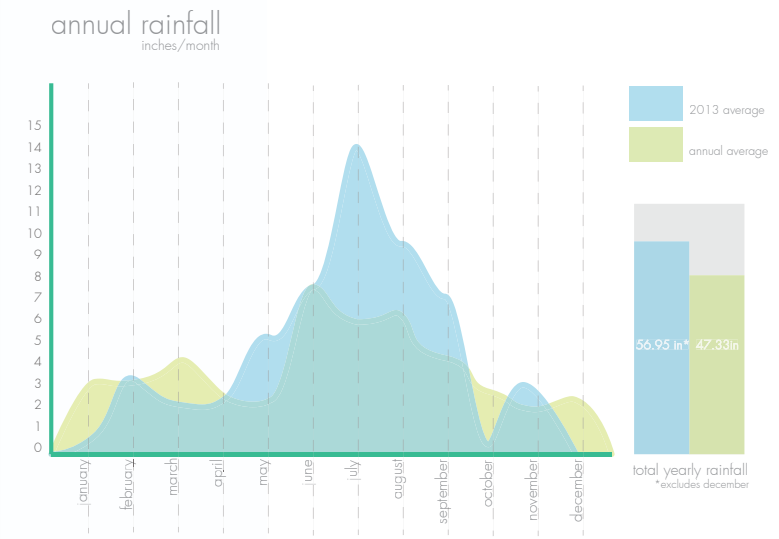
Circulation

Our team surveyed our site in order to identify areas of highest circulation. Head counts were taken during times we deemed to have the highest circulation: times in between classes. We aimed for our design to foster as much user interaction as possible.



Underground Utilities

The campus has an impressive network of used and abandoned underground utilities, ranging from electric and fiber optic lines, to chilled water and gas pipes. Areas with a large amount of underground utilities were to be avoided when possible.



Surface Hydrology

The surface flow of water was identified using a topography map of campus, and this analysis reveals water generally flowing in a generally southern direction. The slope stays relatively consistent, though there are intermittent areas of plateau as well as steep slope. Our analysis confirms we have a natural advantage to move water across our site: gravity.

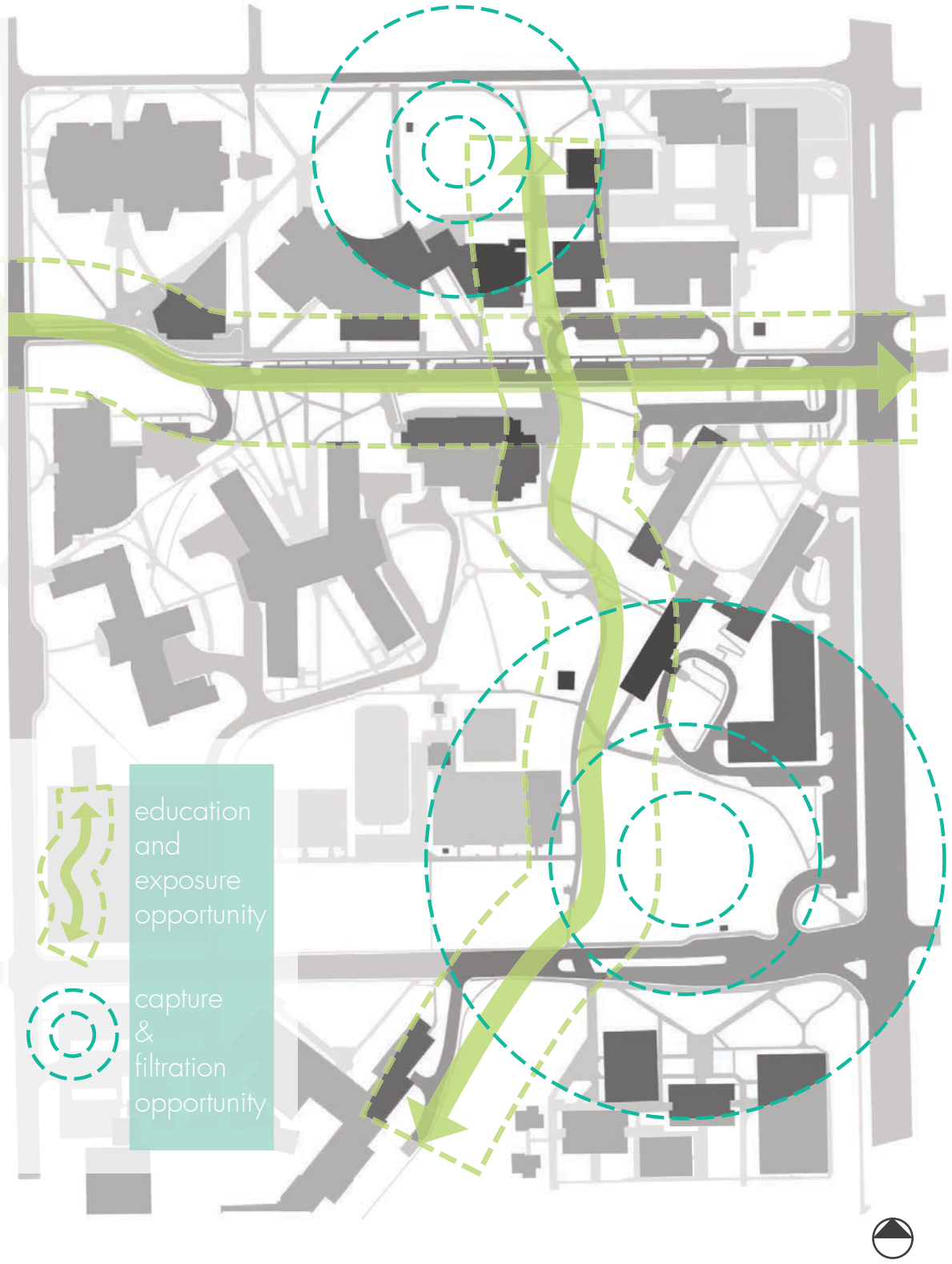
SYNTHESIS
OF SITE CONDITIONS

Overlaying the analysis sheets allowed us to examine the site for opportunities as well as constraints. This layered approach to examing the site gave us the advantage of viewing several aspects of the site at one time. Many areas were identified as prime opportunities for implementing innovative stormwater design techniques as well as creating a space that would describe the journey of water through our site.

Beginning with Gator Pond, the northernmost and highest elevation on site, we identified it to be in close proximity to high circulation areas. A detention node within the stormwater piping network, Gator Pond has potential to become an interactive and engaging space. A pedestrian route receiving a large influx of circulation activity stretches directly from Gator Pond to Yulee Pit and maintains a consistent downhill slope. The attributes make this route an excellent candidate for bioconveyance, which may draw attention towards the movement of water across the site.

Inner Road runs from east to west and is a major circulation route throughout our site. This road conveys high volumes of cars, bicyclists, and pedestrians making their way across campus and could act as a major demonstration for stormwater infrastructure technologies and awareness. While in an optimal location, Inner Road is aged and in need of major renovation; therefore, we identified this corridor as a major opportunity for change.

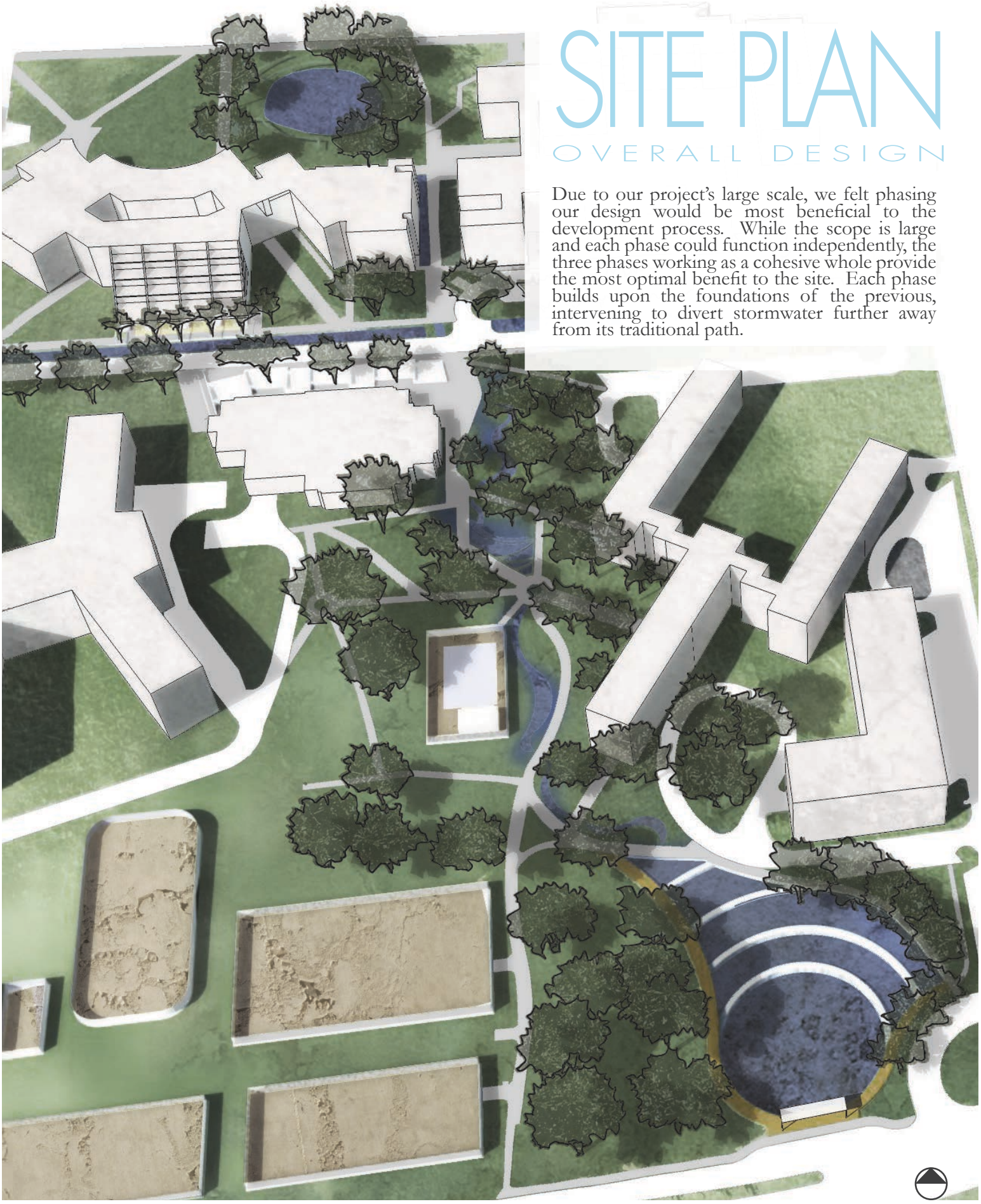
Again through our analysis process, Yulee Pit was identified as a critical area of intervention. In addition, this expansive detention basin has been identified by our Campus Master Plan as a prime area for an attractive stormwater feature. Not only is Yulee Pit the final destination for stormwater before it moves onwards to Lake Alice, but it is also located in an extremely interactive area of campus. Adjacent to US Highway 441 and Museum Road, a design intervention at Yulee Pit would expose our design not only to the student body and faculty, but also visitors passing through the area.

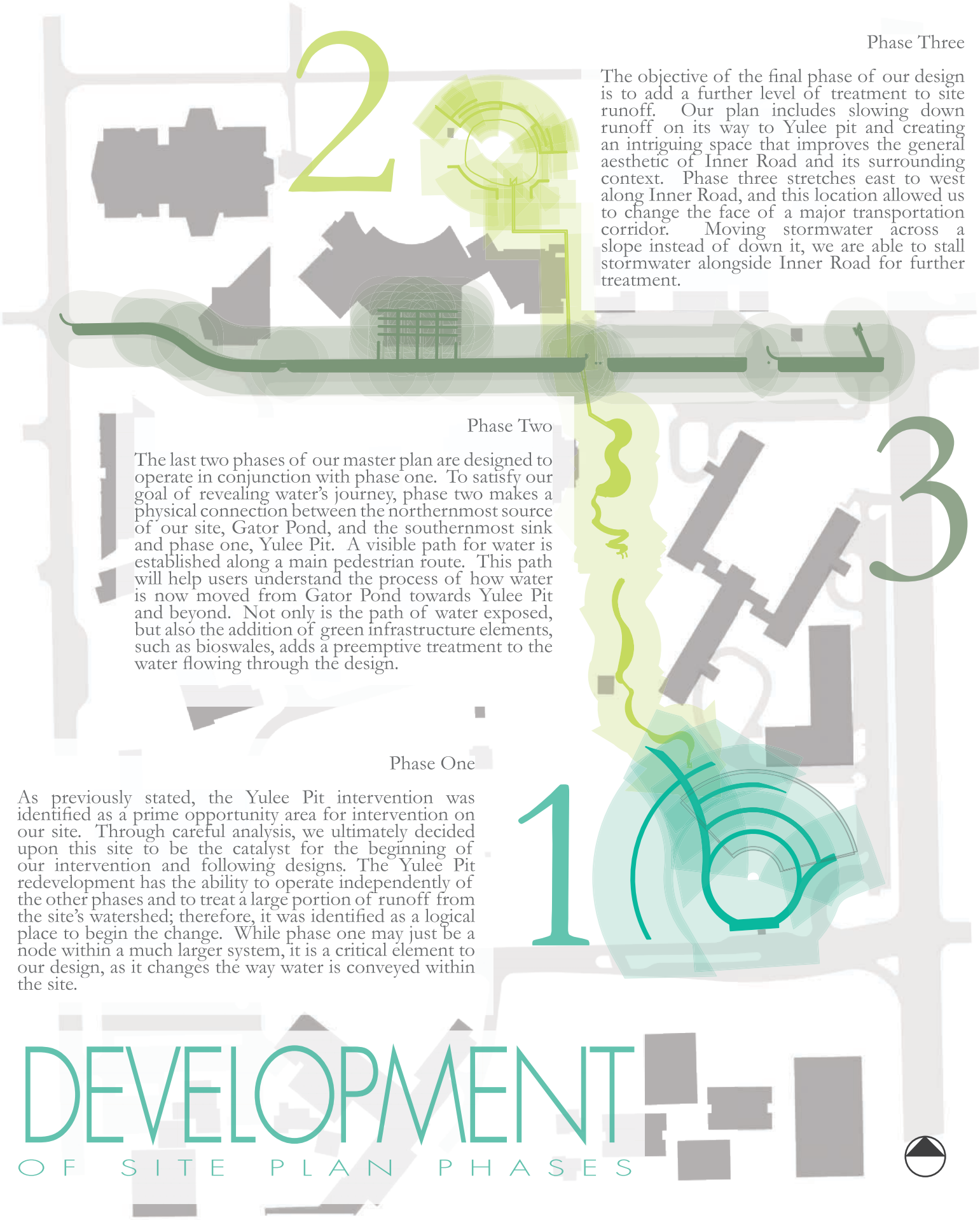


SITE PLAN

OVERALL DESIGN

Due to our project's large scale, we felt phasing our design would be most beneficial to the development process. While the scope is large and each phase could function independently, the three phases working as a cohesive whole provide the most optimal benefit to the site. Each phase builds upon the foundations of the previous, intervening to divert stormwater further away from its traditional path.





Phase Three

The objective of the final phase of our design is to add a further level of treatment to site runoff. Our plan includes slowing down runoff on its way to Yulee pit and creating an intriguing space that improves the general aesthetic of Inner Road and its surrounding context. Phase three stretches east to west along Inner Road, and this location allowed us to change the face of a major transportation corridor. Moving stormwater across a slope instead of down it, we are able to stall stormwater alongside Inner Road for further treatment.

Phase Two

The last two phases of our master plan are designed to operate in conjunction with phase one. To satisfy our goal of revealing water's journey, phase two makes a physical connection between the northernmost source of our site, Gator Pond, and the southernmost sink and phase one, Yulee Pit. A visible path for water is established along a main pedestrian route. This path will help users understand the process of how water is now moved from Gator Pond towards Yulee Pit and beyond. Not only is the path of water exposed, but also the addition of green infrastructure elements, such as bioswales, adds a preemptive treatment to the water flowing through the design.

Phase One

As previously stated, the Yulee Pit intervention was identified as a prime opportunity area for intervention on our site. Through careful analysis, we ultimately decided upon this site to be the catalyst for the beginning of our intervention and following designs. The Yulee Pit redevelopment has the ability to operate independently of the other phases and to treat a large portion of runoff from the site's watershed; therefore, it was identified as a logical place to begin the change. While phase one may just be a node within a much larger system, it is a critical element to our design, as it changes the way water is conveyed within the site.

DEVELOPMENT

OF SITE PLAN PHASES

PHASE 1

DEVELOPMENT

Phase One is implemented as a node at the end of our selected site, serving as the final resting place in the journey of stormwater. This node is a transition point for storm runoff before it is dispersed to Jennings Creek and the greater Lake Alice Watershed. Upon analysis, our team was able to determine that all stormwater outputs for the site watershed outfall into Yulee Pit, but stormwater is not detained in the landscape. Therefore, our design implements a biological stormwater detention facility, which will treat runoff by slowing it down and allowing dissolved solids and sediment to settle out before the runoff is released. Terraces act as infiltration gardens, allowing runoff to filter through dense plantings and permeable soils so that nutrients and other pollutants may be captured as the water travels through.

view into yulee pit

yulee pit elevation

infiltration system

The Yulee Pit design is operable alone, without the other phases, so it stands as a catalyst site to our proposed master plan. Aside from its environmental benefits, this detention facility is designed to be artful and attractive, to make a space that will become iconic near one of the main entrances of campus. Thousands of pedestrians and commuters will pass by it every day, and be able to see how the campus is proactive in its treatment of stormwater. The 2005 – 2015 Campus Master Plan identifies that, "The Yulee Pit area could serve as an aesthetically pleasing water feature/wet retention area", which further supports our intervention in this area.

Basin Name	Total Area (Acre)	CN	CN Phase 2 & 3	Time of Concentration
SSW1	6.43	88.81	88.81	10
SSW2	1.60	84.01	84.01	10
SSW3	5.90	81.82	80.37	10
SSW4	5.02	87.92	86.25	10
SSW5	3.67	88.32	88.32	10
SSW6	9.16	85.26	85.26	14
SSW7	2.20	89.74	85.69	10
SSW8	3.29	86.44	86.44	37
SSW9	17.69	87.94	87.94	35
SSW10	12.90	87.77	87.77	35
SSW11	1.64	89.83	89.83	10

"Hydrologic basin runoff was calculated using the model ICPR3. ICPR (Version 3.10, Service Pack 6; © 2002 by Streamline Technologies, Inc.) is a comprehensive hydrodynamic stormwater modeling system that includes an integrated hydrology component. This model is the preferred model by the Florida Water Management Districts. Rainfall data was input into the model, and was observed and recorded by an on-site rain gauge. The 67.6 acre drainage basin for the project site was delineated into 11 sub-basins. These sub-basins, along with the existing pipe network and proposed sustainable practices, were represented in an accurately detailed ICPR3 model. Curve numbers and time of concentrations were calculated for each sub-basin using approved, TR-55 methods. Boundary conditions were set at the existing Gator Pond and Ocala Pond from known existing permit data."

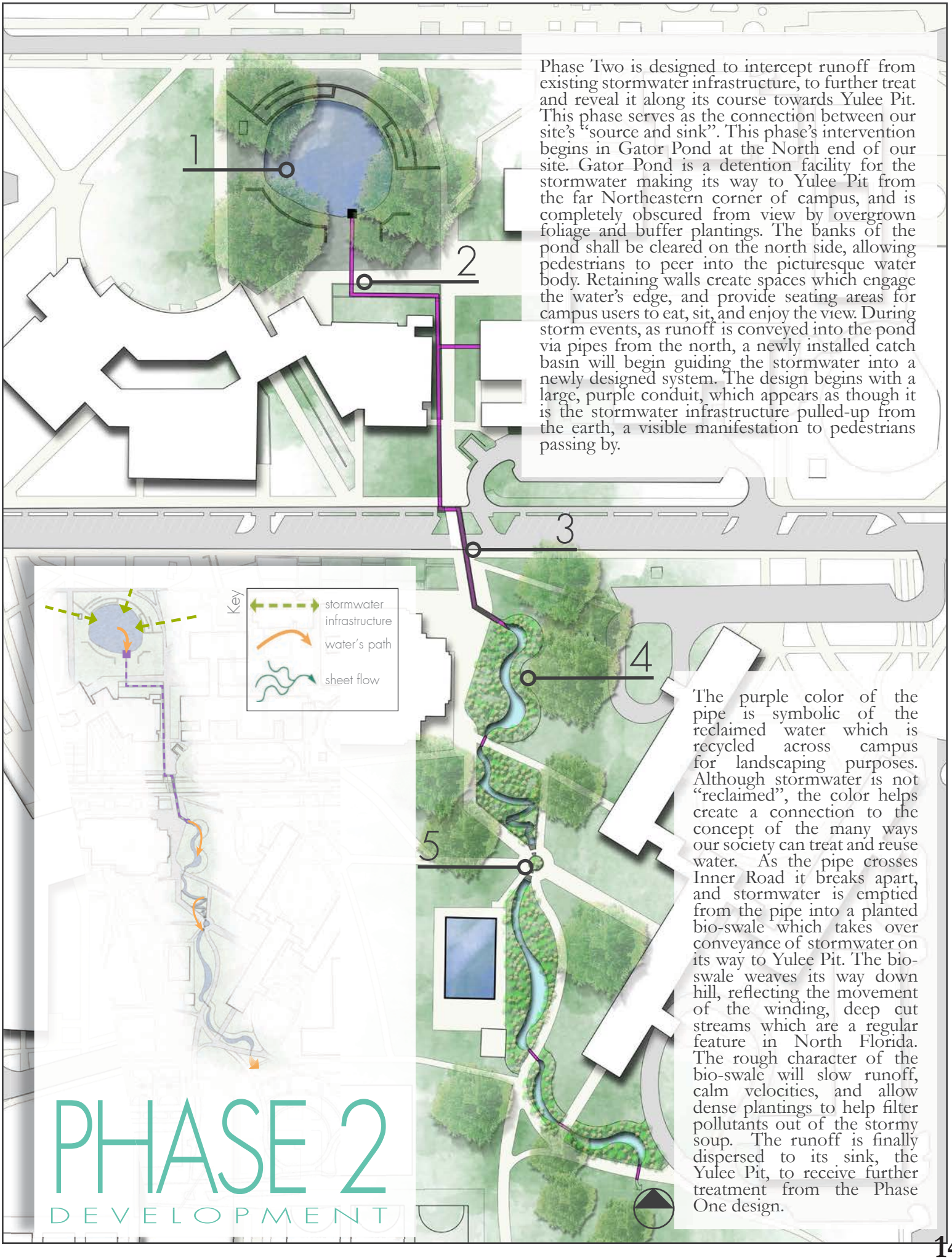
-Tracy Fanara, Hydrologic Data Report

Sustainable Practice	Phase 1 Maximum Water Level			Phase 2 Maximum Water Level			Phase 3 Maximum Water Level		
	1-Year Storm	25-Year Storm	100-Year Storm	1-Year Storm	25-Year Storm	100-Year Storm	1-Year Storm	25-Year Storm	100-Year Storm
Yulee Pit Bioretention (TOB 122ft)	120.4	120.7	121.0	120.4	120.7	121.1	120.5	120.8	121.2
BioSwale from Inner Road to Yulee Pit* (TOB 125.9ft)	N/A	N/A	N/A	124.3	124.4	`124.4	123.9	124.0	124.3
BioSwale/ Raingarden along Inner Road (TOB 148.5ft)**	N/A	N/A	N/A	N/A	N/A	N/A	147.4	148.2	148.5

*Phase 2 Bio-swale maximum stages were taken at the most downstream node **Phase 3 Bio-swale/Raingarden maximum stages were taken at the node receiving outflow from Gator Pond, which is the location of the proposed pipe

"Phase One improvements were modeled for the redesign of Yulee pit. The existing drainage ditch and piping was modeled to be replaced by a bio-retention pond with a bottom elevation set at 110ft and a top of bank elevation set at 122ft. The existing stormwater sewer system was modeled to outfall at Yulee pit, and resulted in a 1-year storm maximum water elevation of 120.4ft, a 25-year storm maximum water elevation of 120.7ft, and a 100-year storm maximum water elevation of 121.0ft. Yulee pit discharges into an existing stream at a slightly lower rate than to the existing stream inflow."

-Tracy Fanara, Hydrologic Data Report



PHASE 2

DEVELOPMENT

Phase Two is designed to intercept runoff from existing stormwater infrastructure, to further treat and reveal it along its course towards Yulee Pit. This phase serves as the connection between our site's "source and sink". This phase's intervention begins in Gator Pond at the North end of our site. Gator Pond is a detention facility for the stormwater making its way to Yulee Pit from the far Northeastern corner of campus, and is completely obscured from view by overgrown foliage and buffer plantings. The banks of the pond shall be cleared on the north side, allowing pedestrians to peer into the picturesque water body. Retaining walls create spaces which engage the water's edge, and provide seating areas for campus users to eat, sit, and enjoy the view. During storm events, as runoff is conveyed into the pond via pipes from the north, a newly installed catch basin will begin guiding the stormwater into a newly designed system. The design begins with a large, purple conduit, which appears as though it is the stormwater infrastructure pulled-up from the earth, a visible manifestation to pedestrians passing by.

The purple color of the pipe is symbolic of the reclaimed water which is recycled across campus for landscaping purposes. Although stormwater is not "reclaimed", the color helps create a connection to the concept of the many ways our society can treat and reuse water. As the pipe crosses Inner Road it breaks apart, and stormwater is emptied from the pipe into a planted bio-swale which takes over conveyance of stormwater on its way to Yulee Pit. The bio-swale weaves its way down hill, reflecting the movement of the winding, deep cut streams which are a regular feature in North Florida. The rough character of the bio-swale will slow runoff, calm velocities, and allow dense plantings to help filter pollutants out of the stormy soup. The runoff is finally dispersed to its sink, the Yulee Pit, to receive further treatment from the Phase One design.

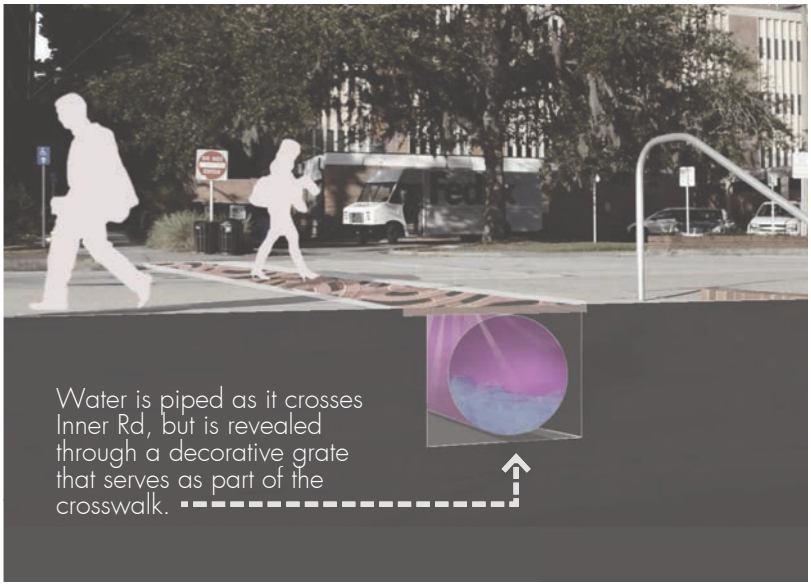
1 gator pond

"Phase Two improvements were modeled in addition to the Phase One Yulee Pit modification. Phase Two was modeled considering the removal of approximately 540ft of existing 30inch storm sewer and 350ft of existing 36inch storm sewer that connected also took into consideration the implementation of a visible surface storm sewer line (for educational purposes) from Gator Pond to a proposed three foot deep meandering bio-swale which channels water from Inner Road to the newly modified Yulee Pit. The 774ft bio-swale, with channel widths ranging from 5ft to 16ft, was modeled with a series of cross-sections and appropriate friction coefficients with ICPR3."

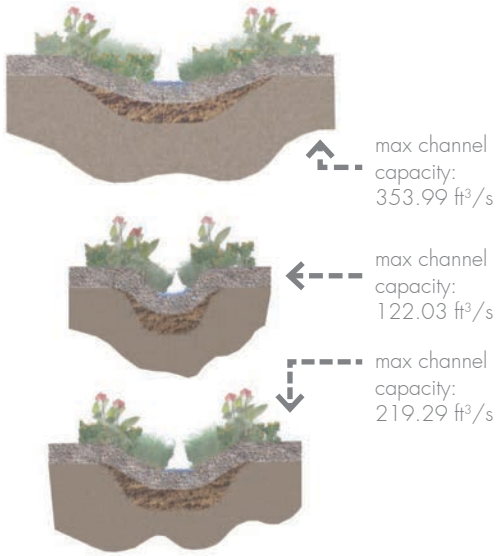
-Tracy Fanara, Hydrologic Data Report

2 exposing infrastructure

3
inner road

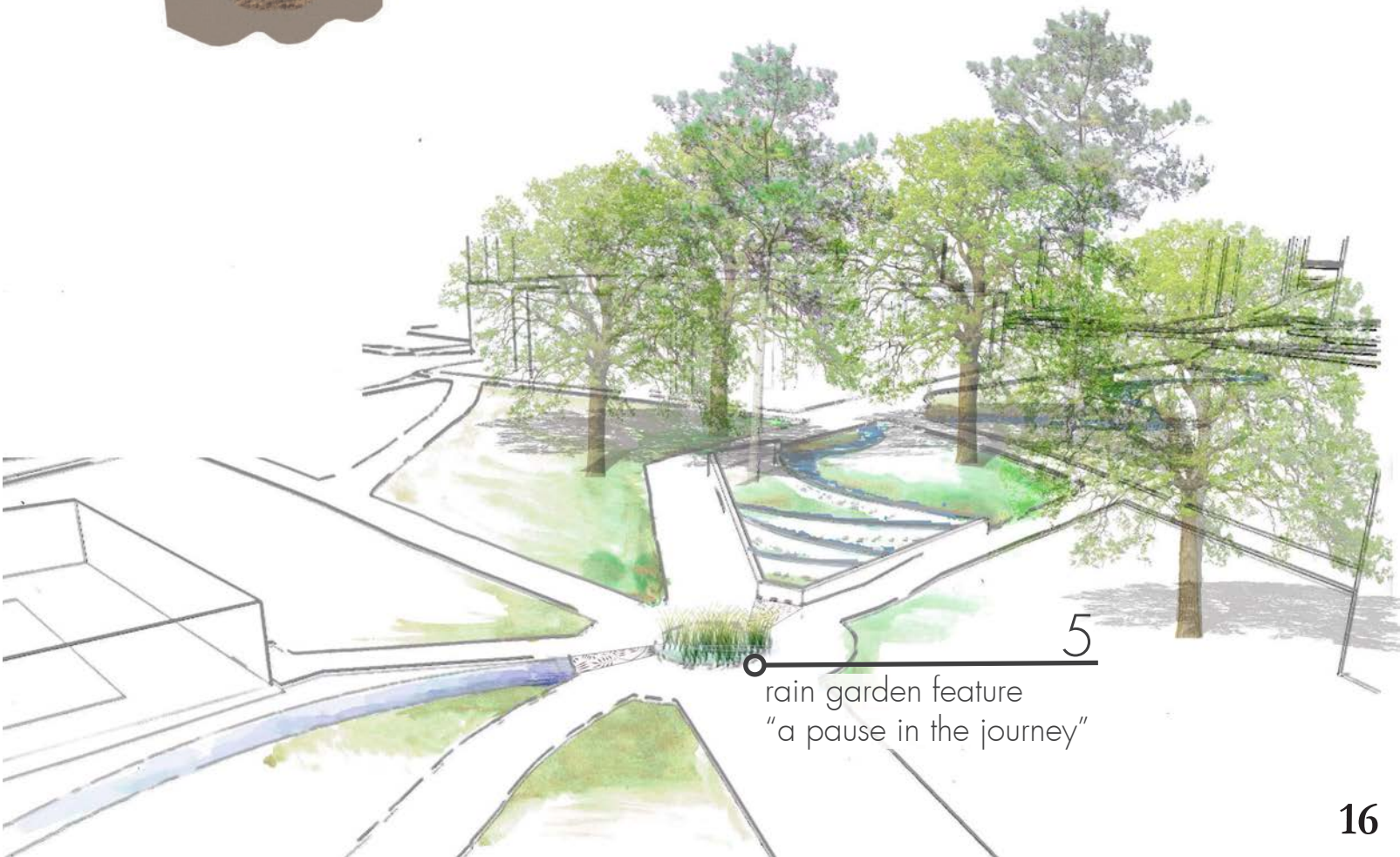


4
varying swale characteristics



"The bioswale will receive 2.10acres of direct impervious runoff (re-routed from existing storm sewer) from four campus buildings. The model results show that the proposed bio-swale will experience a maximum flow of 22.5cfs to Yulee Pit during a 25-year storm event, and a maximum stage of 124.4ft allowing 1.5ft of free board to the top of bank. Yulee pit experienced a 1-year storm maximum water elevation of 120.4ft, a 25-year storm maximum water elevation of 120.7ft, and a 100-year storm maximum water elevation of 121.1ft. Yulee pit discharges into an existing stream at a rate slightly less than the existing inflow with outlet structure modifications."

-Tracy Fanara, Hydrologic Data Report

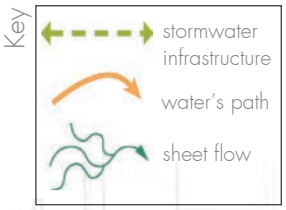


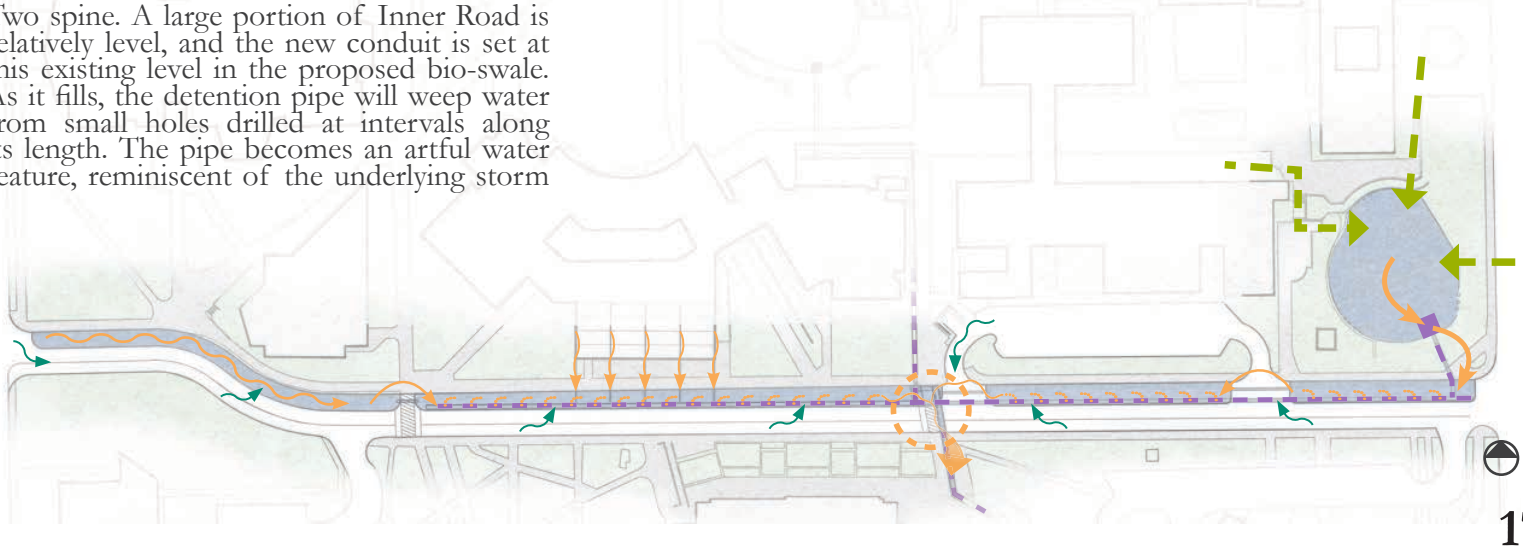
5
rain garden feature
"a pause in the journey"

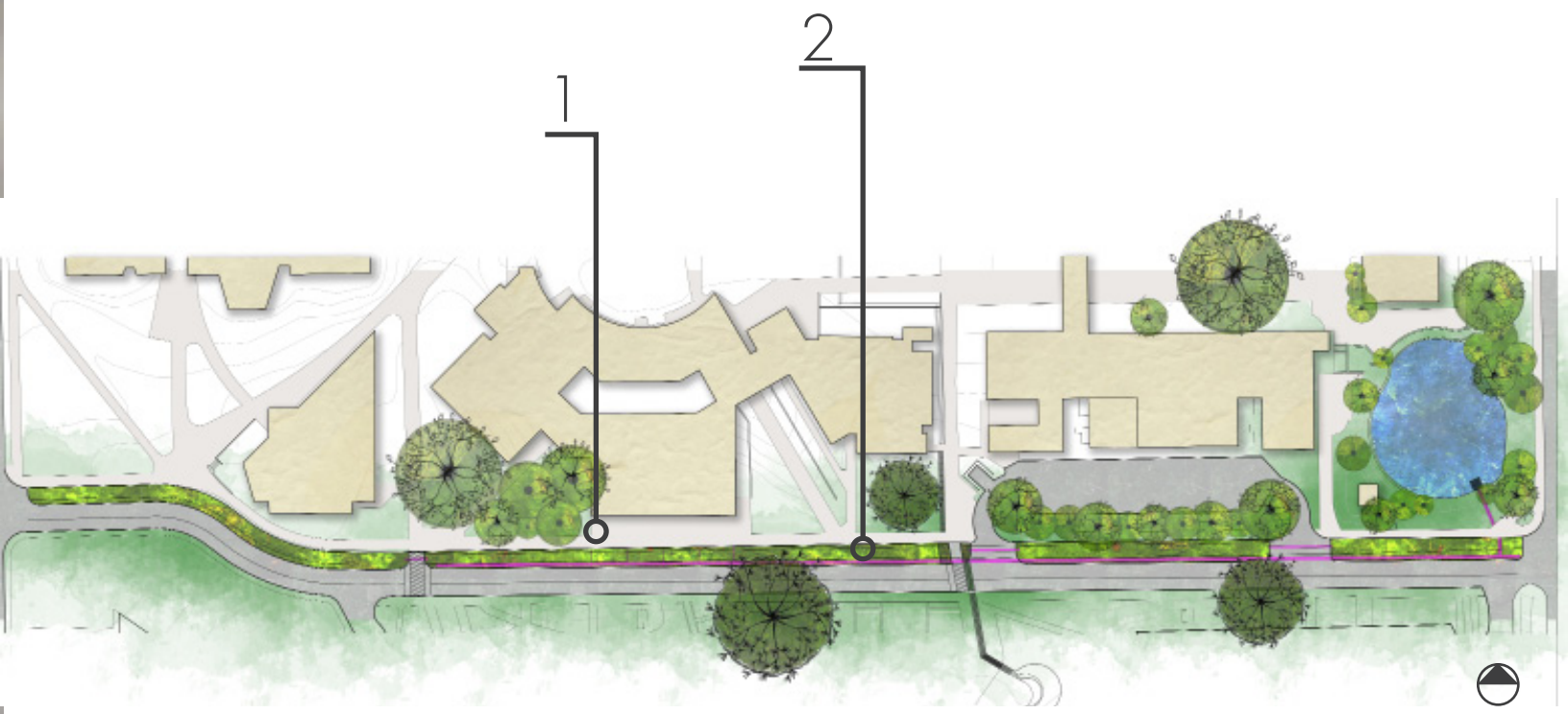
PHASE 3

DEVELOPMENT

The final phase of our design plan involves expanding the treatment system to harvest more stormwater runoff, and thus capture the attention of a larger audience. This phase focuses on Inner road, a high density circulation route in dire need of redesign. Inner Road is re purposed from a circulation route/parking lot into a circulation route/ stormwater treatment wing. The Phase Two piping network is intercepted by a perpendicular addition, which acts as a linear, cylindrical detention vessel, spreading the stormwater runoff to either side of the Phase Two spine. A large portion of Inner Road is relatively level, and the new conduit is set at this existing level in the proposed bio-swale. As it fills, the detention pipe will weep water from small holes drilled at intervals along its length. The pipe becomes an artful water feature, reminiscent of the underlying storm infrastructure, releasing stormwater into the planted bio-swale which will treat water as it resumes its journey towards its source. Phase Three also offers aesthetic and safety improvements to our site. As of now, Inner Road is an uncelebrated corridor where conflicts between user groups are regular. Our design removes the parking from Inner road, opening up views and devoting the space to pedestrians, water treatment, and through-traffic. Our University's Campus Master Plan specifies the desire to become a carbon neutral campus, and programs are already in place which urge people to use alternative methods of travel to campus. The removal of 56 parking spaces is congruent with these desires of creating a carbon neutral campus, while also alleviating user conflicts in the name of increased opportunity.

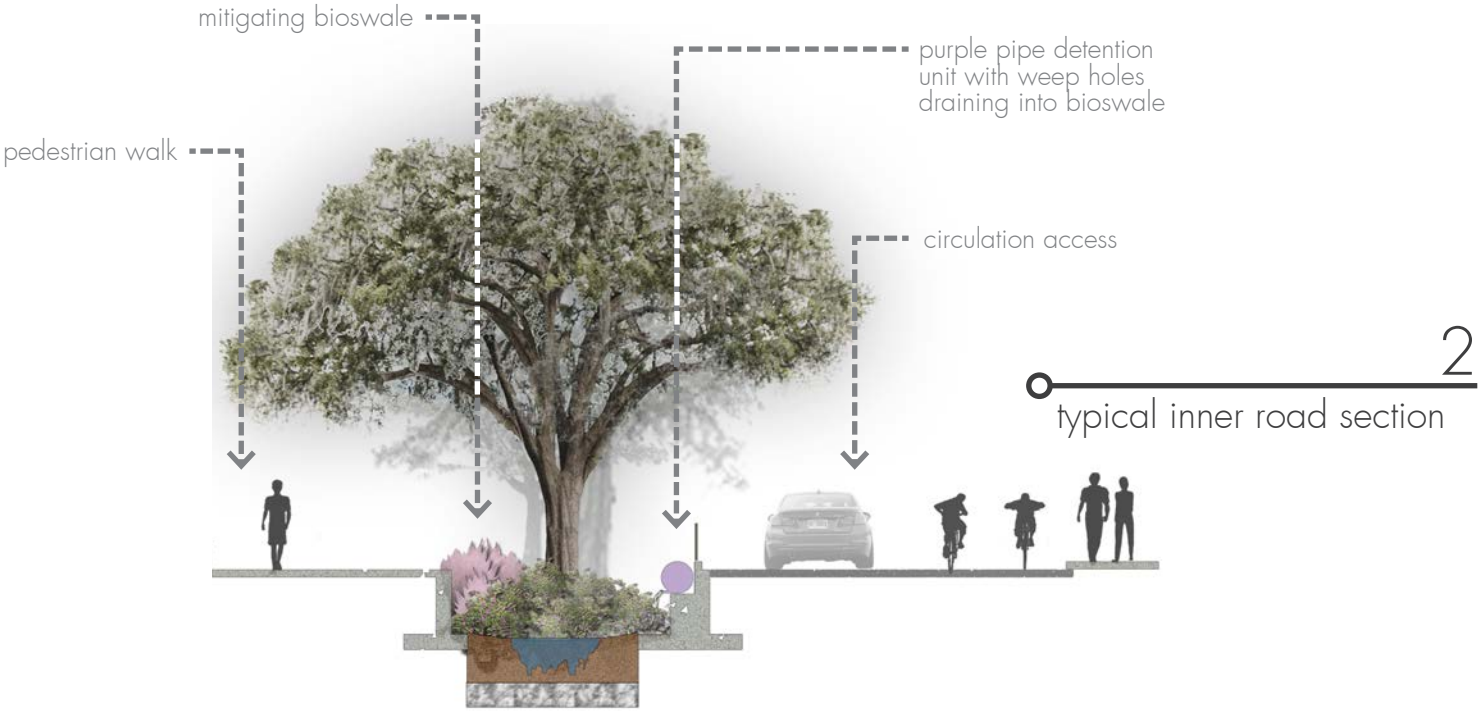






"Phase Three involved the addition of a 15ft wide bio-swale/rain garden along Inner Road, and the removal of all pipe networks in Sub-basin, SSW1. The removal of pipe and replacement with grassed swales will promote infiltration and restoration of the surficial ground water level. The new pipe implemented in Phase Two will be intercepted by a 1300ft long, three foot deep bio-swale/rain garden along Inner Road. The outlet of the bio-swale was modeled as a drop structure with a 36inch pipe which outfalls to the bio-swale (meandering channel) that was implemented in Phase Two. The model results show that the proposed bio-swale/rain garden will experience a maximum flow of 36.5cfs at the outlet node for a 25year storm event, and a maximum stage of 147.4ft, 148.2ft, and 148.5 for the 1, 25, and 100year storms, respectfully. After Phase Three implementation, the bio-swale/meandering channel, constructed in Phase Two, will experience a maximum flow of 32.6cfs during a 100year storm event and a maximum stage of 123.8ft, 124.0ft, and 124.3, for the 1, 25, and 100 year storms, respectively. Yulee pit experienced a 1-year storm maximum water elevation of 120.4ft, a 25-year storm maximum water elevation of 120.8ft, and a 100-year storm maximum water elevation of 121.2ft. Yulee pit discharges into an existing stream at a rate slightly less than the existing inflow with further outlet structure modifications."

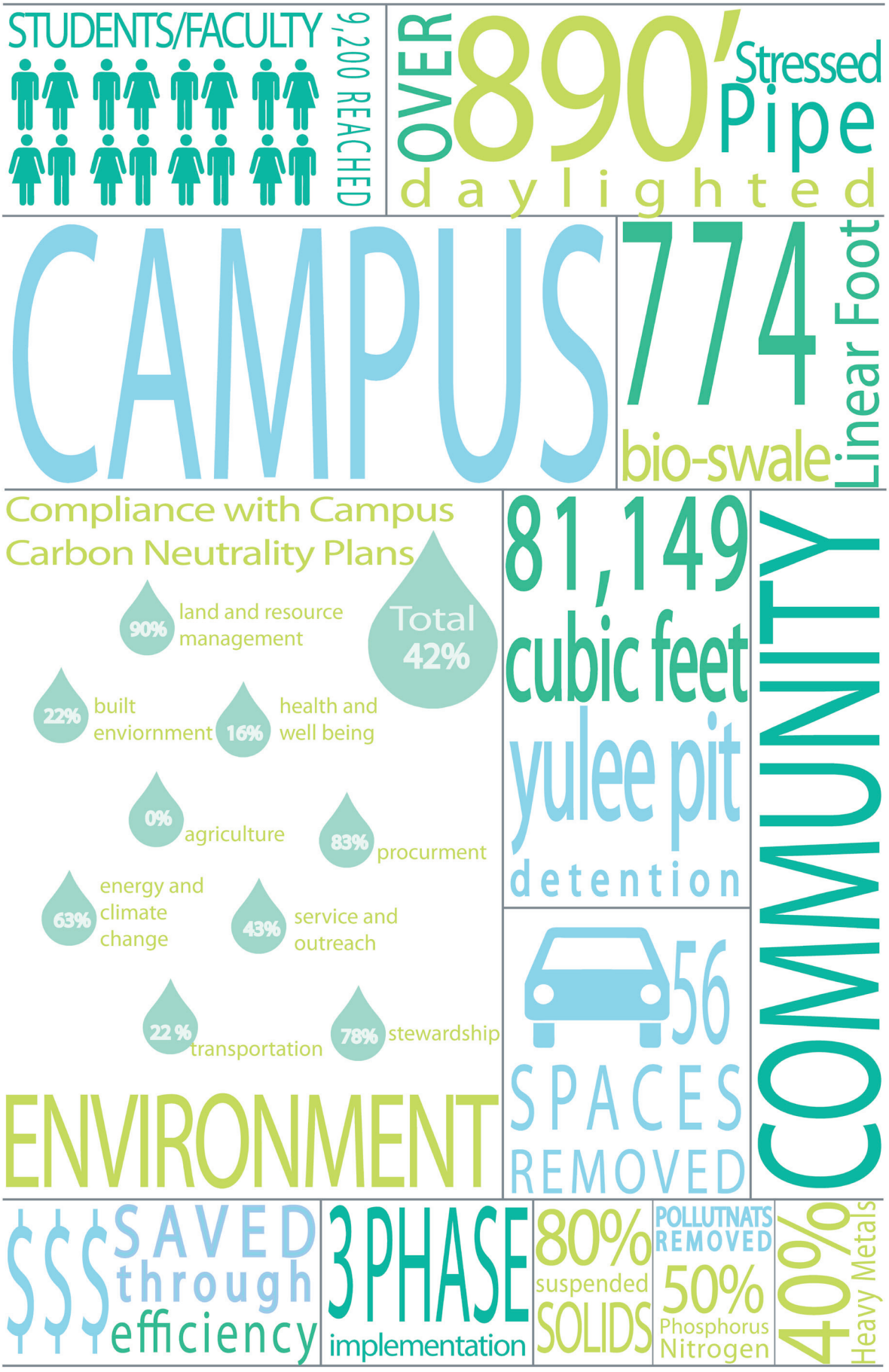
-Tracy Fanara, Hydrologic Data Report



2
typical inner road section

Impromptu group photo with Buster Simpson following design charette.
Not all team members pictured.

Within three phases of design intervention, our team chose to illustrate the path of a significant watershed through our University's campus. By focusing on a specific journey from source to sink, we worked not only to increase public awareness of human development impacts on our waters, but also to engage the public through innovative and evocative conveyance and treatment systems. While working functionally to allow greater water quality improvement on our campus, our design proposal also seeks to serve a higher purpose through its sensory and artful interpretations, instilling a sense of connection and a stronger water ethic to the greater public.


STUDENTS/FACULTY
9,200 REACHED
OVER
890'
Stressed
Pipe
daylighted
CAMPUS
774
Linear Foot
bio-swale
Compliance with Campus
Carbon Neutrality Plans
Total
42%
90%
land and resource
management
22%
built
enviornment
16%
health and
well being
0%
agriculture
83%
procurment
63%
energy and
climate
change
43%
service and
outreach
22%
transportation
78%
stewardship
ENVIRONMENT
81,149
cubic feet
yulee pit
detention
56
SPACES
REMOVED
COMMUNITY
$$$
SAVED
through
efficiency
3 PHASE
implementation
80%
suspended
SOLIDS
POLLUTNATS
REMOVED
50%
Phosphorus
Nitrogen
40%
Heavy Metals

ACKNOWLEDGMENTS

text & image sources

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Barnett, Cynthia. Blue Revolution: Unmaking America's Water Crisis.

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University of Florida Conservation Area Land Management Plan

*All images recorded and produced by team members.

lecture references

Blue Revolution: A Water Ethic for America & Florida. Gators Read Program, sponsored by University of Florida Smathers Library. Presented by author, Cynthia Barnett.

The Watershed of Poetic Utility. Hosted by the University of Florida Student Chapter American Society of Landscape Architecture. Presented by environmental artist, Buster Simpson.

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We greatly appreciate the advice and guidance given by our faculty and professional contributors.